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Miscellaneous Notes and Comments on Toads, Lizards, and Snakes from Mexico

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INTRODUCTION

Despite the surge of interest during recent years in the amphibians and reptiles of Mexico, great gaps still exist in our knowledge of what has proved to be one of the richest herpetofaunas in the world. We lack knowledge especially of the more secretive species that are active above ground only for short periods after heavy rains. Every herpetologist who works extensively in Mexico soon accumulates a series of specimens that represent range extensions, exhibit noteworthy variations in scutellation, coloration, or pattern, or contribute in other ways to our general store of information. Our expeditions to Mexico during the summers of 1959 to 1962, inclusive, yielded similar by-products to our main interest in snakes of the genus *Natrix*, and notes and comments on several of the more important of these are presented herewith. The present paper also includes photographs of live animals of several species almost all of which have not previously been illustrated or have been depicted only by drawings or by photographs of preserved, often distorted, specimens.

Virtually all our material, except samples sent to Mexico in compliance with collecting permit requirements, has been deposited in the American

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Museum of Natural History. Specimens obtained by others are also mentioned in several pertinent instances, and I have included a few items of general interest that came to light while this report was in preparation. The following abbreviations are used in reference to catalogue numbers:

A.M.N.H., the American Museum of Natural History
K.U., the University of Kansas Museum of Natural History
N.D.H., private collection of Nelson D. Hoy, Media, Pennsylvania
S.D.S.N.H., the San Diego Society of Natural History
U.I.M.N.H., the University of Illinois Museum of Natural History
U.S.N.M., the United States National Museum, Smithsonian Institution

Place names mentioned in this paper appear on the American Geographical Society's "Map of Hispanic America, 1:1,000,000," or on one of the 47 sheets constituting "La Carta General de la República Mexicana, de la ex-Comisión Intersecretarial" (1:500,000).

All ventral scale counts for snakes are in accordance with the system proposed by Dowling (1951).

ACCOUNTS OF SPECIES

Bufo cognatus × *Bufo mazatlanensis*

Figure 1

SPECIMENS: *Sonora:* Navojoa (A.M.N.H. Nos. 64216, 64217).

Two toads that appear to be hybrids between *Bufo cognatus* Say and *Bufo mazatlanensis* Taylor were collected during the early evenings of June 26 and June 27, 1959, respectively. The first (A.M.N.H. No. 64216) was found on the porchway of the Del Río Motel where it was feeding on insects attracted by the lights of the establishment. Several individuals of *Bufo marinus* and two *Bufo cognatus* were engaged in the same activity. No specimens of *Bufo mazatlanensis* were seen near the building, but approximately 30 males were calling lustily a few hundred yards away in a small shallow pool adjacent to the Río Mayo. Many other males and a number of females of *mazatlanensis* were seen in the general vicinity of the chorus, but no clasping pairs were noted. No other anurans were heard calling. The second specimen (A.M.N.H. No. 64217) was found along the edge of a shallow part of the Río Mayo about one-half mile downstream from the (then uncompleted) highway bridge (Mexico Highway No. 15).

Bogert (1960, p. 262) commented on the hybrid nature of these two specimens, but included no detailed information about them. Both measure 70 mm. from snout to vent and are thus comparable in size with breeding adults of the two presumed parent species. In recording

the following descriptive matter, I use the term "hybrid" for convenience, even though it cannot be proved that the animals in question are the products of interspecific matings. The two specimens were compared with eight individuals of *Bufo mazatlanensis* (A.M.N.H. Nos. 64233–64240) and two of *Bufo cognatus* (A.M.N.H. Nos. 64241, 64242) all collected June 26, 1959, near or along the Río Mayo at Navojoa, Sonora.

In one hybrid (A.M.N.H. No. 64217) the dorsal pattern consists of large, dark, ovoid blotches comparable in size and shape with those of *Bufo cognatus* (fig. 1). In the other (A.M.N.H. No. 64216) the spots, although approximately the same in number and arrangement, are con-

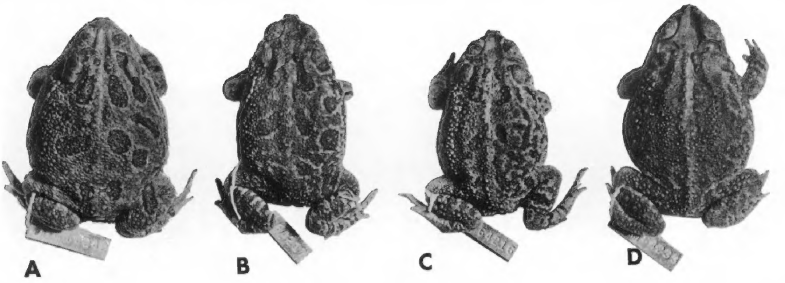

FIG. 1. Dorsal views of toads from Navojoa, Sonora. A. *Bufo cognatus* (A.M.N.H. No. 64242); snout-to-vent length, 75 mm. B, C. Hybrids between *Bufo cognatus* and *Bufo mazatlanensis* (B, A.M.N.H. No. 64217; C, A.M.N.H. No. 64216); snout-to-vent length, 70 mm. in each. D. *Bufo mazatlanensis* (A.M.N.H. No. 64233); snout-to-vent length, 82 mm.

siderably reduced in size. The cranial crests in both specimens are intermediate between those exhibited by the two presumed parent species, but they resemble those of *mazatlanensis* in that the interorbital ridges are well separated from each other and each postorbital ridge has two posteriorly projecting spurs, the lateral one making contact with the parotoid gland. (One or both median spurs are narrowly separated from the postorbital ridge in some of the specimens of *mazatlanensis*.) In neither hybrid, however, are the ridges so sharp and so pronounced as in *mazatlanensis*, and the posteriorly projecting spurs are short, especially in one (A.M.N.H. No. 64216). The parotoid glands of both hybrids are also intermediate, both in size and shape. The metatarsal tubercles are dark brown and fairly well developed; they are not so pronounced as the strong, black "spades" of *cognatus*, but they are much larger than the pale, weak tubercles of *mazatlanensis*.

There have been profound recent changes in the lower Río Mayo Valley resulting from the damming of the stream and diversion of its

waters for agricultural purposes. Dozier (1963) reviewed the history of this project and commented on some of the changes in the physical environment. Bogert (*loc. cit.*) pointed out that disturbances of habitats are probably responsible for recent extensions of ranges in the region, and that *Bufo cognatus* is now abundant in parts of Sonora where it was not previously encountered. Here again, as has so frequently been documented in the literature in recent years, alteration of the environment by human activities has resulted in the breakdown of isolating mechanisms, in this case apparently permitting *cognatus* and *mazatlanensis* to hybridize.

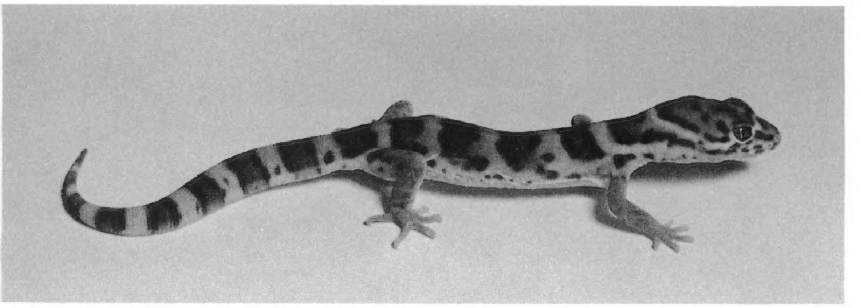

FIG. 2. *Coleonyx variegatus sonoriensis* × *fasciatus* (A.M.N.H. No. 87617); 18 miles northwest of Culiacán, Sinaloa; total length, 127 mm.; head-body length, 59 mm.; female. An intergrade specimen between the races *sonoriensis* and *fasciatus* of *Coleonyx variegatus*.

Coleonyx variegatus sonoriensis × *fasciatus*

Figure 2

SPECIMEN: *Sinaloa:* Eighteen miles northwest of Culiacán (A.M.N.H. No. 87617).

This specimen, which combines some of the characters of *Coleonyx fasciatus* (Boulenger) and some of *Coleonyx variegatus sonoriensis* Klauber, was found as it crossed the road (Mexico Highway No. 15) through an area of thorn forest during the early evening of September 22, 1961. An *Imantodes* (A.M.N.H. No. 87594), which is discussed below in this paper, was found dead on the road at virtually the same time and place. The gecko is a female with a total length of 127 mm. and a head-body length of 59 mm. The tail appears to be complete and not regenerated, even in part.

A comparison of this lizard with the diagnoses for *sonoriensis* and *fasciatus* published by Klauber (1945, pp. 162 and 182, respectively) indicates that it: (a) agrees with *fasciatus* in having virtually solid dark

TABLE 1

MAJOR PATTERN DIFFERENCES BETWEEN TWO SPECIMENS OF *Coleonyx* FROM MEXICO

	sonoriensis × *fasciatus* (A.M.N.H. No. 87617; see Fig. 2)	Type of (*Eublepharis*) *fasciatus* (From Günther, 1890 [1885-1902], pl. 31, fig. A)
Locality	18 miles northwest of Culiacán, Sinaloa	Ventanas, Durango[a]
Dark cross bands between limb insertions	Four	Three
Edges of dark cross bands	Uneven and irregular	Regular and clean-cut
Light areas between cross bands	Not enclosed laterally; more or less continuous with light areas of ventral surface	Enclosed laterally and bordered by dark (black?) pigment
Dorsal surface of head	Dark but marked with about nine small, rounded, dusky spots	Uniformly dark
Lateral surfaces of body and tail	Marked with numerous small, dusky spots	Not spotted

[a] Zweifel, (1956, p. 22) stated that "Ventanas, Durango (on more recent maps as Villa Corona), is at an elevation of 620 meters in the barranca of the Río Presidio."

brown cross bands and no enlarged postnasal scales; and (b) agrees with *sonoriensis* in having four cross bands on the body between the limb insertions. I have compared it with seven specimens of *sonoriensis* from Sonora (A.M.N.H. No. 73757, from Miramar Beach near Guaymas; A.M.N.H. Nos. 74697, 74896-74899, from El Desemboque; and A.M.N.H. No. 75137, from 15 miles west of Hermosillo) and with the figure of the type of (*Eublepharis*) *fasciatus* in Günther (1890 [1885-1902], pl. 31, fig. A). In all seven of these specimens of *sonoriensis* there are enlarged postnasals, although in two specimens they are only slightly larger than the adjacent small scales of the head. All have four dark cross bands, and in each there is a vertebral light stripe that splits the bands into paired rectangles, completely in three specimens and partially in four. The markings in all are pale.

Pattern characteristics of the gecko herein reported and illustrated (fig. 2) are contrasted in table 1 with those of the *fasciatus* delineated in Günther (*loc. cit.*).

Taylor (1935, p. 204), in reporting on a specimen of *fasciatus* from "about 15 miles south of Presidio, Sinaloa," stated that the "cream-white bars" between the dark cross bands "are for the most part confluent with the ventral coloration." In this one characteristic Taylor's specimen

apparently more closely resembles the lizard from northwest of Culiacán than it does the type of *fasciatus*.

In comparison with the series of *sonoriensis*, the cross bands on our lizard are much darker, and they show no indication of being split down the back. The legs and digits appear to be more robust than those of *sonoriensis* (Klauber, 1945, p. 182), but this character is so subjective that it is of little value, at least with only one specimen at hand for purposes of comparison.

In view of the intermediate nature of this specimen and because it was collected between the ranges mapped for *fasciatus* and *sonoriensis* by Klauber (1945, p. 214), I interpret it as an intergrade between the two forms. Hence, *fasciatus* becomes a race of the wide-ranging banded gecko and may be designated as *Coleonyx variegatus fasciatus*.

Eumeces obsoletus (Baird and Girard)

SPECIMENS: *Chihuahua:* Balleza (A.M.N.H. No. 68296). *Durango:* Palmitos (A.M.N.H. No. 85267).

The Chihuahua specimen was collected July 21, 1947, by the David Rockefeller Expedition for the American Museum of Natural History along the Río de Balleza, a northward-flowing tributary of the Río Conchos. The locality is about 40 miles west of Hidalgo del Parral and is at an elevation of 5800 feet, according to Goldman (1951, p. 117). This skink is a juvenile (head-body length, 42 mm.) in which the adult pattern is beginning to appear, even though the general coloration is still quite dark. The pale head spots, which are so conspicuous against the black ground color of hatchlings of *obsoletus*, are still visible on the upper labials and as a row of seven smaller spots extending posteriorly in a line from the supranasal across the supraoculars to the parietal. There is a postnasal on each side of the head and there are two postmentals.

The Durango specimen was found September 13, 1960, coiled beneath a stone in a narrow gallery forest not more than 20 feet from the Río San Juan, a tributary of the Río Nazas. The locality has an elevation of 4650 feet and is approximately 11 miles south-southeast of Rodeo. The permanency of the stream is attested by the presence of cypresses (*Taxodium*), in addition to willows and cottonwoods, the two more common components of gallery forests of the region. Although the lizard was collected about noon, it was cold and sluggish. The microhabitat, which had a northern exposure to the river, was well shaded and apparently had not yet been reached by the sun. No temperatures were recorded at the time, but it had been 48° F. at 6:30 A.M. a few miles farther north. This specimen, an adult male and with a head-body length of 88 mm.,

has two postmentals, no postnasals, and is typically patterned with olive-gray dorsal scales margined with black. Both it and the Chihuahua specimen have the scales in oblique rows on the sides of the body, as is typical in this species.

These two localities extend the known range of *Eumeces obsoletus* much farther to the southwest than any previously reported stations for the species. Since both are associated with rivers traversing arid regions, I have been prompted to review all records for this scincid in Mexico to determine whether its distribution parallels in any manner the distributions of recently studied elements of the desert river faunas (Conant, 1963).

When all Mexican localities are plotted, it is apparent that each is along a river or closely associated with a mesic habitat. All those reported for Chihuahua to date are from along the Río Conchos or its tributaries: Ciudad de Chihuahua (Taylor, 1936, p. 320); near Victoria Guadalupe (Legler and Webb, 1960, p. 19); Santa Clara and Fortín (Smith, Williams, and Moll, 1963, p. 212); and Balleza, as reported above.

The Durango record is from along a tributary of the Río Nazas. In Coahuila *Eumeces obsoletus* is known from Cuatro Ciénegas (Schmidt and Owens, 1944, p. 107), an area noted for its many springs and (chiefly formerly) associated swamps. There are two stations for it in Nuevo León: Santa Caterina (*sic;* Taylor, *loc. cit.*) and Monterrey (Martín del Campo, 1953, p. 135). Santa Catarina is adjacent to the Cañon de la Huasteca, long a popular collecting site for naturalists and which has a stream passing through it. The Río de Monterrey crosses the southern part of the city for which it is named, but it is now usually dry, and its banks have been profoundly altered as a result of urbanization and industrialization.

All these localities fall within or close to the edges of the Chihuahuan Desert, which has been variously mapped by Shreve (1942, p. 212), Tinkham (1944, p. 260), Jaeger (1957, p. 35), and Milstead (1960, p. 77) who used different criteria for delimiting its boundaries.

From farther eastward Taylor (*loc. cit.*) also reported *obsoletus* from Matamoros, Tamaulipas, in a region where there are numerous *resacas* and other mesic habitats. From west of the Sierra Madre Occidental (well west of the Chihuahuan Desert) the only locality in the literature is from near Huasabas, Sonora (Cliff, 1953, p. 186), where a specimen was taken in a (possibly temporary) marshy habitat.

The Mexican localities are still too few and scattered to permit more than speculation on the zoogeographical history of this skink. The range of *Eumeces obsoletus* throughout much of the arid southwestern United States is similarly disjunct and associated with habitats where moisture

is available. Lowe (1964, p. 164), in commenting on its distribution in Arizona, stated that it occurs "principally on the banks or in the near vicinity of permanent and semi-permanent streams or arroyos in the desert, grassland, and mountains" and that "in the desert it is a strictly riparian species." Fitch (1955, p. 62), in his review of the habits and adaptations of *obsoletus*, stated that "in the southwestern part of its range the species seems to be increasingly confined to rugged terrain" and "evidently the Great Plains skink is rare or absent in the intervening stretches of desert plains."

Most specimens collected in the Southwest have been taken where mesic or quasi-mesic conditions prevail, at least during part of the year, but Richard G. Zweifel (personal communication) also reports finding a juvenile "under a piece of tin in a shady area by a fallen-down garage" in a region of slightly sloping *Larrea* desert in the Jornado del Muerto of New Mexico.

Other members of the genus *Eumeces* have disjunct distributions in arid western United States and northern Mexico, where they occur as relicts in upland areas that receive more rainfall than the desert regions between them. A recent example is afforded by Anderson (1962) who reported *Eumeces brevilineatus* from the Sierra del Nido, Chihuahua, an isolated range near the western edge of the Chihuahuan Desert. Far from being restricted to upland areas in Mexico, *Eumeces obsoletus* occurs along streams or other sources of moisture in desert valleys or lowland areas.

Whether *Eumeces obsoletus* ranged widely across northern Mexico during more mesic Pleistocene or post-Pleistocene periods than those prevailing at the present time and during the recent past, or whether it achieved at least part of its present disjunct distribution by penetrating along streams that traverse the Chihuahuan Desert is a matter of conjecture, but future collecting and detailed studies on the geology and climatology of the region may shed light on the problem.

Coniophanes bipunctatus biseriatus Smith

Figure 3

SPECIMEN: *Veracruz:* Two miles southwest of Coatzacoalcos (A.M.N.H. No. 88814).

The specimen, a male in good condition, was found dead on the road on the same night as the individual of *Coniophanes quinquevittatus* listed below, and the general habitat is discussed under the latter species.

The scutellation is as follows: dorsal scales 21–19–17; ventrals 128;

subcaudals not counted (tail incomplete); upper labials 8 on left side of head, 9 on right; lower labials 10; oculars 1-2; temporals 1-2; total length, 448+ mm.; head-body length, 346 mm. The color pattern differs from the diagrammatic wash drawing of the species published by Bailey (1939, pl. 1, fig. 5) in that the dorsum is more nearly uniform dark brown, and the longitudinal striping is less clearly evident. The two lowermost rows of scales are brown, and the same dark pigment extends onto the lateral tips of the ventrals. The chin and throat are longitudinally streaked (fig. 3); the double row of conspicuous black spots extends the length of

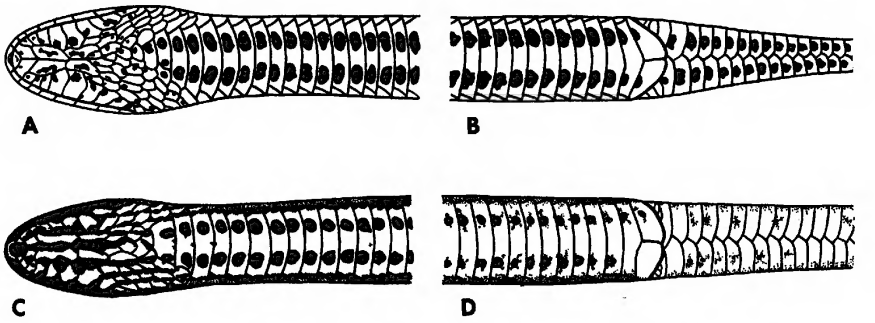

FIG. 3. Ventral patterns in *Coniophanes quinquevittatus* and *Coniophanes bipunctatus*, semidiagrammatic views of under sides of heads and anterior parts of bodies (left) and ventrals and subcaudals in the region of the vent (right). A, B. *Coniophanes quinquevittatus* (A.M.N.H. No. 88815) from 7 miles southwest of Coatzacoalcos, Veracruz; head-body length, 575 mm. C, D. *Coniophanes bipunctatus* (A.M.N.H. No. 88814) from 2 miles southwest of Coatzacoalcos, Veracruz; head-body length, 346 mm.

the belly, but is represented on the under surface of the tail by only a few scattered black spots, mostly concentrated near the base of the tail.

Ventral pattern characteristics of *Coniophanes bipunctatus* are contrasted with those of *Coniophanes quinquevittatus* (see below), and, in making these comparisons, I have examined the following 16 specimens of *bipunctatus*, in addition to the one reported upon above: *British Honduras:* Belize (U.S.N.M. Nos. 24902, 26061, and 55860); Huamil in Gallon Jug area (A.M.N.H. No. 70929). *Guatemala:* (U.S.N.M. 6756). *Honduras:* Agua Azul on shore of Lake Yojoa, Cortés (A.M.N.H. No. 70220). *Mexico:* Palenque, Chiapas (U.S.N.M. No. 108595, type of *Coniophanes bipunctatus biseriatus* Smith); Cafetal Mirador, Oaxaca (A.M.N.H. No. 22736); Mogoñé, Oaxaca (U.I.M.N.H. No. 37155); Tehuantepec, Oaxaca (U.S.N.M. No. 30343); 15 miles north of Teapa, Tabasco (U.I.M.N.H. Nos. 47898-47900); Orizaba, Veracruz (U.S.N.M. No. 30226); Potrero

Viejo, Veracruz (U.S.N.M. No. 109715); and Tierra Colorado, Veracruz (U.I.M.N.H. No. 17604).

Although these specimens by no means represent the total material extant for *Coniophanes bipunctatus*, data recorded for them suggest that the status of the subspecies *biseriatus* (Smith, 1940, p. 59) and variation in the species *bipunctatus* in general are in need of study.

Coniophanes quinquevittatus (Duméril, Bibron, and Duméril)

Figure 3

SPECIMEN: *Veracruz:* Seven miles southwest of Coatzacoalcos (A.M.N.H. No. 88815).

The highway (Mexico No. 180) extending southwestward from Coatzacoalcos to the vicinity of Minatitlán traverses an extensive fresh-water marsh contiguous with and broadly paralleling the west bank of the Río Coatzacoalcos. At the time of our visit the marsh was densely covered with vegetation, much of it emergent, and there were only a few small patches of open water, chiefly in the roadside ditches. The area was completely devoid of trees except on a few scattered islands and tongues of presumably higher land. After examining our photographs of the area, C. L. Lundell, an authority on the flora of the region, suggested that it be designated as a *Typha-Pontederia-Thalia* marsh (fig. 4). Other semi-aquatic reptiles and amphibians found on the same highway on the same or the preceding night included *Coniophanes bipunctatus biseriatus*, *Natrix rhombifera werleri*, *Thamnophis proximus rutiloris*, and *Rana pipiens* ssp.

The specimen of *Coniophanes quinquevittatus*, a female, was found dead on the road shortly after dark during the evening of August 3, 1962. Part of the tail is missing as the result of an old, long-healed amputation. It has a total length of 720+ mm. and a head-body length of 575 mm. Details of scutellation are: scale rows 21-19-17; ventrals 159; labials 8-10; oculars 1-2; and temporals 1-2 on the left side of the head and 1-1 on the right. The upper postocular is fused with the anterior temporal on the right side of the head. The color pattern approximates the diagrammatic wash drawing of this species published by Bailey (1939, pl. 1, fig. 6), except that the light area between the stripes is much darker than he depicted and the dark lateral stripe is not nearly so conspicuous. Also there is an irregular, frequently interrupted row of small black spots down the center of the belly. These spots are much smaller than the bold, black, round, or oval ones that compose the two conspicuous parallel rows of markings running the length of the belly and under the tail. There are also a number of scattered tiny black spots and flecks on scales of the two outermost rows, but these rows are essentially plain white (in the

preserved specimen). The dark lateral stripe encroaches on the upper half of the second scale row on the posterior part of the body.

This species has been known heretofore from Veracruz only from the type of *Hydrops lubricus* Cope (1871, p. 217) for which the locality is stated as "Coatzacoalcos River, Vera Cruz." Bailey (1939, p. 26) placed *Hydrops lubricus* in the synonymy of *Coniophanes quinquevittatus*, an action in which I concur. The only other Mexican localities reported for the

FIG. 4. General view of the *Typha-Pontederia-Thalia* marsh southwest of Coatzacoalcos, Veracruz, with *Thalia geniculata* in the foreground (photographed August 4, 1962). Both *Coniophanes bipunctatus* and *Coniophanes quinquevittatus* were found on the highway traversing this marsh.

species are approximately 15 miles north of Teapa (Smith, 1960, p. 223) and 44 miles west of Cárdenas (Fouquette and Rossman, 1963, p. 190); both are in Tabasco.

The key characters used for differentiating between *Coniophanes bipunctatus* and *C. quinquevittatus* (Bailey, 1939, p. 13; Smith and Taylor, 1945, p. 38) are: (a) a conspicuous lateral dark stripe in *quinquevittatus* (none in *bipunctatus*); and (b) more than 150 ventrals in *quinquevittatus* and fewer than 150 in *bipunctatus*. Unfortunately the light areas between the stripes may be dark in some specimens of *quinquevittatus*, as in the present specimen, so that the lateral dark stripe is not particularly con-

spicuous. The number of ventrals is strongly diagnostic, but checking them is time consuming, especially if live specimens are involved.

A comparison of the chin and throat patterns of this snake and the specimen (A.M.N.H. No. 88814) of its sibling, *bipunctatus*, reveals a marked difference (fig. 3), which appears to be constant throughout the ranges of the two species. In *quinquevittatus* the under surface of the head is boldly marked with small, rounded, black spots against a background of white or pale yellow; in *bipunctatus* there are several parallel rows of dark lines at each side of the throat, and dark pigment tends to follow the edges of the scales on the ventral surface of the head. In addition, the markings on the belly and under surface of the tail are also diagnostic. In *quinquevittatus* the paired, bold, black spots remain large and conspicuous throughout the length of the belly and are strongly continued on the tail. In *bipunctatus* the pairs of ventral spots are largest and blackest on the throat and anterior part of the body; posteriorly they decrease in size and boldness, and under the tail they are small, longitudinally elongated, or represented only by scattered black dots. With the use of these characters, it is possible to separate the two species with ease. The markings are discernible even in a large adult female of *bipunctatus* (U.I.M.N.H. No. 47899 from 15 miles north of Teapa, Tabasco) in which an abundance of dark pigment partly obscures both the dorsal and ventral patterns. As Bailey (1939, p. 25) pointed out, the black ventral spots in *bipunctatus* may be replaced in whole or in part by dark ocelli, especially in adults. The differences in ventral patterns of the two species were clearly delineated by Jan and Sordelli (1866, fig. 4; 1868, fig. 1).

In addition to the individual recently acquired from near Coatzacoalcos, the following specimens of *Coniophanes quinquevittatus* were compared with the series of *Coniophanes bipunctatus* listed under that species: *Guatemala:* Flores Lake, Petén (A.M.N.H. No. 74483). *Mexico:* "Southern Mexico" (U.S.N.M. No. 109806); 15 miles north of Teapa, Tabasco (U.I.M.N.H. No. 47901); Coatzacoalcos River, Veracruz (U.S.N.M. No. 61182, type of *Hydrops lubricus* Cope).

Conophis lineatus dunni Smith

SPECIMENS: *Oaxaca:* Matías Romero (A.M.N.H. Nos. 65930, 65931).

T. C. MacDougall collected these two specimens in 1945, but unfortunately they were catalogued incorrectly and were not included among the material seen by Wellman during the preparation of his review of the genus *Conophis* (1963). They represent the first definite locality for *dunni* from Mexico.

Both snakes are males, and they measure 472 mm. and 785 mm., respectively, in total length. Both apparently have complete tails; the tail length divided by the total length is 21 and 20 per cent, respectively. The dorsal scale rows are 19–17, with the reduction resulting from the fusion of the third and fourth rows of scales. The upper labials are 8, with the fourth and fifth entering the eye; the lower labials are 9 except that in A.M.N.H. No. 65931 there are 10 on the left side of the head. The oculars are 1-2 in both snakes, and the temporals, although irregular, are basically 2-2-3. Counts that vary between the two snakes are: ventrals 164 and 161 and subcaudals 67 and 66 (data for A.M.N.H. No. 65930, the smaller specimen, appear first in each instance). Wellman (1963, p. 264) gave 67 as the minimum number of subcaudals among 14 males of *dunni* and (p. 268) as 68 among 11 males of the subspecies *lineatus*.

In pattern, both snakes agree closely with Wellman's figure 1B (1963, p. 261). There are well-defined black stripes on the first, third, fourth, seventh, and eighth scale rows, and there is a row of small discrete black spots extending along the lateral edges of the ventrals directly adjacent to the lowermost row of scales. The black stripes on the third and fourth rows are well separated from each other on the anterior half of the body in the larger specimen, but posteriorly they coalesce to form a single, broad, black stripe. They appear to be united throughout the length of the body in the smaller snake, but their dual nature, at least anteriorly, can be demonstrated when the scales of the third row are stretched away from those of the fourth.

On the basis of distances "as the crow flies," the Matías Romero locality is closer to the nearest known station for the subspecies *lineatus* in Veracruz than it is to the nearest station for *dunni* in Guatemala near the Mexican boundary (Wellman, 1963, p. 263). It is likely that *dunni* ranges westward through the dry coastal areas of Chiapas and Oxaca. Although Matías Romero is on the Atlantic slope of the Isthmus of Tehuantepec, it is close to the crest of the low divide. It also is possible that the specimens were collected a short distance south of the town, which would place the exact locality on the Pacific slope or even in the semiarid coastal belt.

Elaphe flavirufa flavirufa (Cope)

Figures 5, 6

SPECIMENS: *Tamaulipas:* Sixty miles east of Ciudad Mante (N.D.H. no number). *Veracruz:* Four miles southwest of Molino (=17 miles southwest of Pánuco). The latter specimen is alive at the Philadelphia Zoological Garden but will be deposited eventually in the collection of the

Department of Herpetology of the American Museum of Natural History.

Both snakes were found crossing the road at night, the Veracruz specimen (? female) during mid-evening on August 20, 1962, and the Tamaulipas snake (male) on April 15, 1963. In the following summaries data for the (smaller) Tamaulipas specimen appear in parentheses. The total lengths are 1365 mm. (717 mm.); tail lengths, 265 mm. (151 mm.).

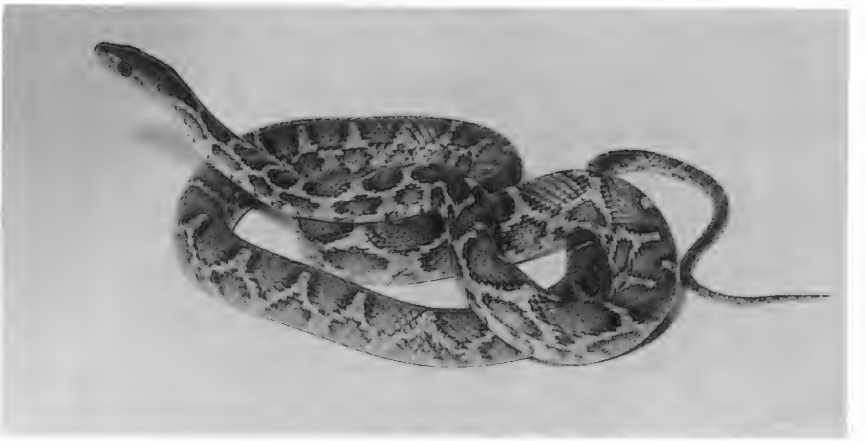

FIG. 5. *Elaphe flavirufa flavirufa* (live specimen in the Philadelphia Zoological Garden); 17 miles southwest of Pánuco, Veracruz; total length, about 1365 mm. Dorsal view.

(Measurements for the live Veracruz snake are approximations.) In both specimens the maximum number of scale rows is 29, the minimum near the tail is 19, and the fourth, fifth, and sixth upper labials enter the eye. Ventrals are 253 (252), subcaudals 108 (109). There are approximately 40 dorsal body blotches and 18 tail blotches on each snake, but many of the markings are confluent with the adjacent ones, and an accurate count is virtually impossible. The single preocular scale in each is large and extends upward to the frontal.

The following color notes were recorded from the live Veracruz snake on March 27, 1964. Capitalized color names are in accordance with Ridgway (1912). The dorsal blotches are orange-brown (Tawny), but they darken to Dresden Brown near and on the tail; their borders are very dark brown or black. The ground color between the blotches is Cream-Buff between and on the edges of the scales, but most of each scale is washed with olive (Light Yellowish Olive anteriorly, but changing to Buffy Olive posteriorly and on the tail). The ground color of the head

is Light Brownish Olive. The iris is bluish gray (between Storm Gray and Castor Gray); the pupil is black and capable of marked contraction to a semi-elliptical shape, as illustrated by Mertens and Rosenberg (1943, p. 61). The chin and throat are white. The belly is pale yellow (Marguerite Yellow anteriorly but changing to Colonial Buff and finally to Chamois near and under the tail). The subcaudals are stippled with

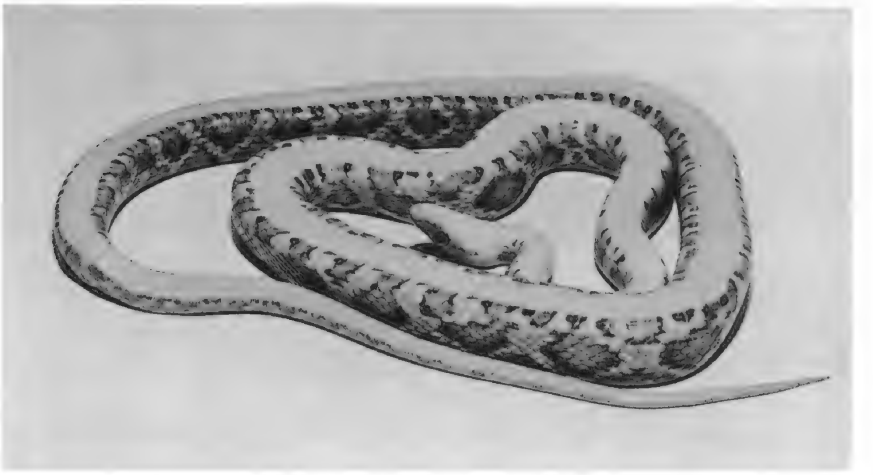

FIG. 6. *Elaphe flavirufa flavirufa*, same snake as is shown in figure 5. Ventral view.

Light Yellowish Olive. The tongue is pink, with tiny flecks of black; the tongue tips are pale, almost white.

This snake fed well on adult white mice in captivity. It was gentle, made no attempt to bite, and almost invariably tried to climb upward and out of its cage when it was replaced after cleaning (suggesting arboreal tendencies?).

Elaphe flavirufa flavirufa is still relatively rare in collections. When Dowling (1952) studied the species, only 16 specimens of this race were available to him, including five mentioned in a footnote on page 4 that he apparently received after his paper had gone to press. Smith and Darling (1952, p. 83) reported on four of these same five snakes, two each from San Luis Potosí and Tamaulipas, and they illustrated one of them. Taylor (1950, p. 448; 1953, p. 1605) added three more from eastern San Luis Potosí, Martin (1958, p. 69) listed six from the Gómez Farías region of southwestern Tamaulipas, and Fouquette and Rossman (1963, p. 191) helped bridge a major gap in the range of the subspecies by recording a specimen from southern Veracruz.

Elaphe subocularis (Brown)

SPECIMEN: *Nuevo León:* Eleven miles west of Santa Catarina (A.M.N.H. No. 85283).

When Dowling (1957) reviewed this species he listed only two Mexican localities, both in Coahuila. Unfortunately he had not seen a paper by Martín del Campo (1953, p. 141) in which *Elaphe subocularis* was reported from the Cañon de la Huasteca. The present specimen does not, therefore, represent the first known locality for the state of Nuevo León. It was found in midmorning on September 22, 1960, and apparently had just been killed on the (Saltillo-Monterrey) highway, which at that point is near the lower end of the pass through the Sierra Madre Oriental. It is a male with a total length of 1055 mm. and a tail length of 160 mm. The tail length divided by the total length is 15 per cent, a ratio high for the species. Dowling (1957, p. 2) derived his ratios by dividing the tail length by the body length (instead of the total length), and he stated that the tail averages "between 16 and 17 per cent of body length in individuals with body lengths of 500 to 1000 mm." The tail length divided by the body length in this specimen is 17.9 per cent. There are 21 body blotches, including a faint indication of one at the anterior end of the series, and there are 10 tail blotches. Six to eight rows of scales on the sides of the body are smooth (unkeeled).

Because the Martín del Campo paper is not readily available to most herpetologists, I include his scale counts for the Cañon de la Huasteca animal in the following summary, putting them in parentheses: scale rows 33-34-23 (30-34-23); ventrals 273 (279); subcaudals 78 (77); upper labials 10 (12); lower labials 15 on the left side of the head, the right side is damaged (14); oculars 1-2 (1-2); temporals 4+3+4 on the left side and 4+4+4 on the right (4+3); lorilabials 4 on the left and 2+1 on the right (3). The lorilabials in our specimen do not form a continuous series on the right side of the head, for the fifth upper labial enters the eye. Martín del Campo did not give blotch counts or measurements for his specimen or indicate its sex. His count of 279 ventrals equals the maximum reported by Dowling (1957, p. 15) for the species (based on a snake from near Saltillo), if it be assumed that Martín del Campo made the counts in accordance with the Dowling (1951) system.

Imantodes gemmistratus latistratus (Cope)

Figure 7

SPECIMENS: *Nayarit:* Four miles south of Rosamorada (A.M.N.H. No.

84167); 4 miles northeast of San Blas (A.M.N.H. No. 87593). *Sinaloa:* Eighteen miles northwest of Culiacán (A.M.N.H. No. 87594).

The important specimen among these is the one from Sinaloa, for the locality it represents is roughly midway between the two northernmost published stations for the species (Rancho Guirocoba, Sonora, and near Coyotitán, Sinaloa), and thus helps close a gap of nearly 250 miles in the range as mapped by Zweifel (1959, p. 11).

The patterns of the three specimens (all females) fall within the extent of variation outlined by Zweifel (1959, pp. 4–6). The two snakes from

FIG. 7. *Imantodes gemmistratus latistratus* (A.M.N.H. No. 84167); 4 miles south of Rosamorada, Nayarit; total length, 565 mm.; female.

Nayarit are pale and even their dorsal saddles are relatively light, but the dorsal markings of the one from Sinaloa contrast rather strongly with the ground color. The sum of the lengths of the first three saddles (the number of scales counted along the middorsal line in each) is 21 and 25 in two snakes, but the lengths cannot be counted accurately in the third because the saddles are split in half, with the halves alternating and partially fusing with each other along the middorsal line. The number of saddles, the combined lengths of the first three, and the ventral and subcaudal counts appear in table 2. Zweifel (1959, pp. 6–7) gave the range in ventrals among six northern female specimens of *latistratus* as 223 to 232, mean 228.3, and that in subcaudals among five northern

TABLE 2
COUNTS OF DORSAL SADDLES, VENTRALS, AND SUBCAUDALS IN *Imantodes gemmistratus latistratus*

	A.M.N.H. No. 84167	A.M.N.H. No. 87593	A.M.N.H. No. 87594
Locality	Near Rosamorada	Near San Blas	Northwest of Culiacán
Date collected	7/10/59	9/4/61	9/22/61
Dorsal saddles	46	53 (left side) 50 (right side)	37
Combined length of first three saddles	25	?	21
Ventrals	222	217	229
Subcaudals	117	119	122

females as 109 to 120, mean 115.8. Compared with those in Zweifel's sample, the two snakes from Nayarit have fewer ventrals; the subcaudal count is higher in the snake from northwest of Culiacán. In the present small sample, the latter specimen (A.M.N.H. No. 87594) has a stronger pattern and fewer dorsal saddles, more ventrals, and more subcaudals than the two from Nayarit.

Masticophis flagellum lineatulus Smith

SPECIMEN: *Zacatecas:* Twenty-two miles east-southeast of Sombrerete (A.M.N.H. No. 82156).

Although this snake, a female, had been partially crushed by one or more vehicles when found on the road on July 19, 1959, it is in sufficiently good condition for one to obtain virtually a full set of scale counts from it. The maximum number of dorsal rows is 17 and the minimum is apparently 12, although the condition of the animal will not permit a count immediately anterior to the anal region. The ventrals are 193, and the subcaudals 99. The diagnostic pattern characteristics for adults of this form, as enumerated by Smith (1941, p. 394), are all present. Each dorsal scale, at least on the anterior part of the body, bears a longitudinal dark line or a posterior dark spot, the under side of the tail is salmon-colored, and the posterior portion of the belly is a pale salmon orange. This color is not nearly so intense, however, as it is in another dead-on-the-road adult (male) we found and preserved at about the same time (A.M.N.H. No. 82155 from 3 miles north of Ciudad Camargo, Chihuahua, July 23, 1959). Also the pairs of black spots on the throat are not so bold and conspicuous in the Zacatecas snake as are those in the one from Chi-

huahua and in two juveniles from Durango (A.M.N.H. No. 82154 from 5 miles northwest of Nombre de Díos and A.M.N.H. No. 87599 from 40 miles east of La Zarca). The dark dorsal cross bands in both young Durango snakes are narrower than the light areas between them, and, except for the first two cross bands, one anterior and one posterior to a broad, virtually patternless area on the nape, they are only about one scale in width. In this respect the young snakes key out (Smith, 1941, pp. 397–398) to the subspecies *flavigularis* (=*testaceus*) rather than to *lineatulus*, which would be expected in Durango on zoogeographical grounds.

This is the first record for this snake from Zacatecas, although Taylor (1952, p. 811) reported *lineatulus* from Illescas and Hernández in extreme western San Luis Potosí near the border of Zacatecas.

Pituophis melanoleucus affinis Hallowell

Figure 8

SPECIMENS: *Durango:* Guatimape (A.M.N.H. No. 88822); near the Río del Tunal, 6 miles east of (Ciudad) Durango (A.M.N.H. No. 85252). *Zacatecas:* Río Florido, 15 miles northwest of Fresnillo (A.M.N.H. No. 85251).

All three localities represent range extensions, and the specimen from Zacatecas is of additional importance since it demonstrates sympatry with *Pituophis deppei deppei* (see below). The Guatimape snake was crawling across a paved road in a well-cultivated region during the early afternoon of July 18, 1962, and the one near the Río del Tunal was found partly crushed on a dirt road in an area of riparian woodland on September 15, 1960. The Zacatecas specimen came from a "cactus-acacia-mesquite scrub" association (Webster, 1958, p. 246) near where we camped August 20, 1960.

Scale counts for the Zacatecas snake (A.M.N.H. No. 85251) are: dorsal scale rows 29–31–29–27–25–23–21; ventrals 218; subcaudals 49; upper labials 8, the fourth and fifth entering the eye; lower labials 12; one preocular; postoculars 3 (left) and 4 (right); and temporals 3–3. There are four prefrontals, and the posterior tip of the rostral penetrates between the internasals for half of their length. The snake is a female with a total length of 1430 mm. and a tail length of 175 mm., and the tail length divided by total length is 12 per cent.

There are 33 large brown dorsal blotches on the body, and eight on the tail, and these are bordered in part by narrow dark brown lines (black on the forepart of the body). The blotches on the rear of the body and those on the tail, which are better described as cross bands, are darker

and more clear cut than those farther forward. In life the markings were conspicuously reddish against a yellowish tan ground color, and those near and on the tail were a rich, reddish brown. None of the blotches or cross bands is black. The venter is yellowish white, with light brown squarish markings at the lateral edges of every third, fourth, or fifth ventral. These markings are represented by small dark spots anteriorly, but they are better defined posteriorly and occur throughout most of the length of the body. Under the tail they are confluent with the (dorsal) cross bands.

The fact that two labials enter the eye requires comment. The fourth upper labial is broadly in contact with the orbit; the fifth labial enters

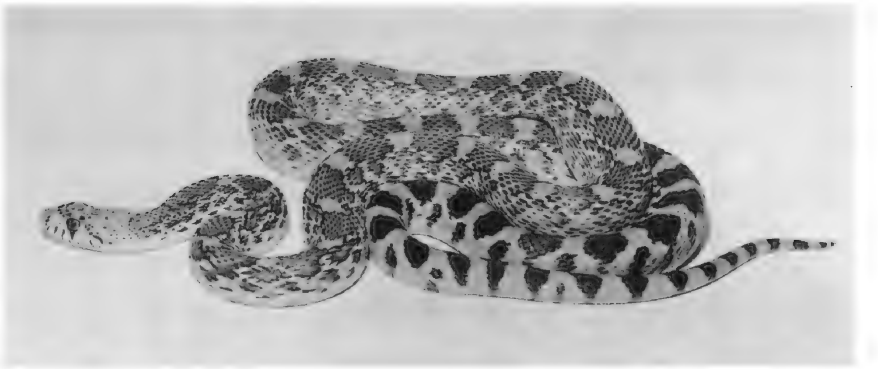

FIG. 8. *Pituophis melanoleucus affinis* (live specimen in the Philadelphia Zoological Garden); 3 miles northeast of El Palmito, Durango; total length, about 1180 mm.; male. The brown dorsal blotches are palest on the anterior part of the body, but they become darker and better defined on the posterior part of the body and tail.

only very narrowly on the right side of the head, but the contact is greater on the left. All forms of *Pituophis melanoleucus* (including those formerly classified as races of *Pituophis catenifer*) normally have only a single upper labial entering the eye, and this character, in conjunction with the presence of four prefrontals (instead of two), has long been used in keys (Stull, 1940, pp. 23-25; Smith and Taylor, 1945, pp. 105-106) for distinguishing between *melanoleucus* and *Pituophis deppei*. The specimen from Guatimape (A.M.N.H. No. 88822) also has two labials entering the eye on both sides of the head, the fourth broadly and the fifth very narrowly. Among nine other specimens of *affinis* from Durango that I have examined (see list below) only a single labial scale enters the eye. All 10 Durango snakes have four prefrontals, and in each the rostral penetrates posteriorly approximately half of the length of the nasals.

In all the Durango specimens the coloration is similar to that of the Zacatecas snake. All the dorsal blotches, including those on the anterior part of the body, are brown; posteriorly the blotches are darker and better defined, and the cross bands on the tail are particularly conspicuous. Reddish tones are strongly evident in many, notably in the two live snakes. Only in the Río del Tunal specimen, a juvenile with a total length of 357 mm., are there any black markings, and the black is confined to the last few blotches on the body and the cross bands on the tail.

During the early evening of the day following our acquisition of the Zacatecas specimen of *affinis*, we found a specimén of *Pituophis deppei deppei*

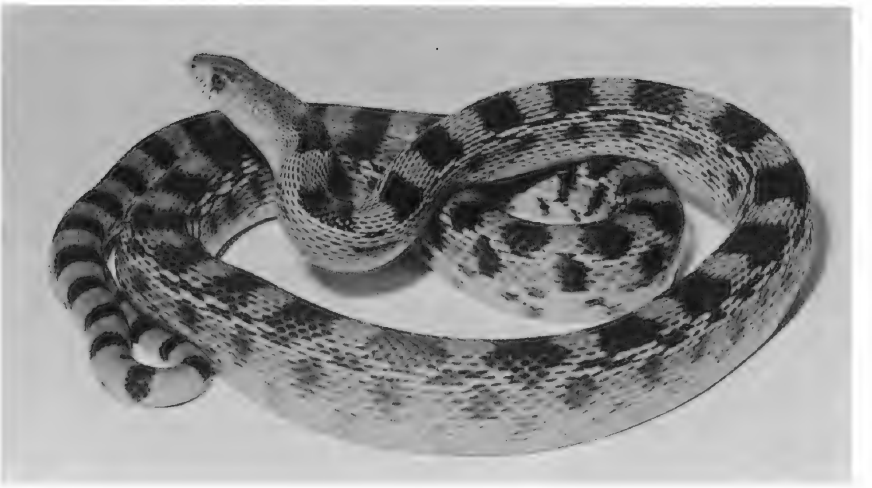

FIG. 9. *Pituophis deppei deppei* (A.M.N.H. No. 92738); 6 miles east of Sombrerete, Zacatecas; total length, 1217 mm.; male. The dorsal blotches are black on both the anterior and posterior parts of the body and on the tail; approximately the eleventh to the twenty-third blotches are brown.

(A.M.N.H. No. 85247 from 15 miles northwest of Fresnillo, Zacatecas) dead on the road within 100 yards of our camp site, and in a habitat identical (to our eyes) with that in which the specimen of *affinis* was taken. The specimen of *deppei* is a male that measures 752 mm. in total length and 107 mm. in tail length, and the tail length divided by the total length is 14 per cent. The scale counts are: dorsal scale rows 27-29-31-29-27-25-23; ventrals 216; subcaudals 55; upper labials 8, with the fourth and fifth entering the eye on the left side of the head, but with only the fourth entering on the right; lower labials 13 on the left and 12 on the right; oculars 1-3; temporals highly irregular but 4 in the first row. There

are two prefrontals, and the rostral protrudes between the internasals only slightly. There are 42 dark dorsal blotches on the body and nine cross bands on the tail. The dorsal markings in this individual of *deppei* are much darker throughout the length of the body than are those in the specimen of *affinis* from the same locality, and they are black on the posterior part of the body and the tail. The ventral markings are also much more numerous and darker than those in the *affinis*, and there are many dark squarish spots on the center of the belly as well as on the lateral edges of the ventrals. On part of the tail, there is an irregular dark brown stripe extending along the common sutures of the subcaudals.

We obtained an additional specimen of *deppei* in Zacatecas (A.M.N.H. No. 92738 from 6 miles east of Sombrerete), which is illustrated in figure 9. On this snake, a male with a total length of 1217 mm., both the dorsal blotches on the body and the cross bands on the tail are black, with the exception of approximately the eleventh to the twenty-third blotches, which are dark brown. There are two prefrontals, two labials enter the eye, and the rostral does not penetrate between the internasals. In all respects this is a typical *deppei*.

Another individual of *deppei* (A.M.N.H. No. 68361 from 10 miles east of El Salto, Durango) requires comment. This is also a male, with a head-body length of 684 mm. (tail incomplete). In comparison with the two Zacatecas specimens this snake is much more boldly marked, with the dorsal pattern in strong contrast to the ground color. The first six blotches are black as are also approximately the last 15 blotches; the others are dark brown; the cross bands on the tail are black. There are two prefrontals, but only a single labial, the fourth, enters the eye. The upper labials number seven, but the fifth and sixth apparently are fused into a single large scale on each side of the head. The rostral penetrates posteriorly more than a third of the distance between the internasals. Although this upland specimen is referable to *deppei*, it is anomalous in having only one labial entering the eye, and the rostral extends between the internasals as far as in many individuals of *affinis*.

In summary, 11 specimens of *affinis* from Durango and Zacatecas have brown body blotches that are palest on the anterior portions of their bodies, and all have four prefrontals. In contrast, among the three *deppei* examined the anterior markings are dark (black in two), those near midbody are brown, and those near and on the tail are black; all have two prefrontals. In these characteristics all are typical of their respective forms.

The number of upper labials entering the eye, long used as a key character, is subject to some variation among the specimens herein reported.

In the *affinis* from Zacatecas and in another from Durango two labials enter the eye. In one *deppei* a single labial enters the eye, and in a second *deppei* two enter the eye on one side of the head and one on the other. In the single locality (15 miles northwest of Fresnillo) where sympatry can be demonstrated, the specimen of *affinis* has the abnormal number of labials entering the orbit whereas that of *deppei* has the normal number on one side of the head but not on the other.

Dixon, Sabbath, and Worthington (1962, p. 96) report an anomalous number of prefrontals (four instead of two) in four specimens of *deppei* among a series of 19 snakes from San Luis Potosí and southwestern Nuevo León (K.U. Nos. 67694–67712). I have recently examined these specimens, all of which are small, but my interpretation of the prefrontals is at variance with theirs. In six of these 19 snakes there are departures from the normal number of two prefrontals (characteristic of *deppei*), but in none of the six are there four discrete prefrontals all in contact with the frontal, the usual arrangement in the many races of *melanoleucus*. The nearest approach to this condition occurs in a specimen (K.U. No. 67706) from 25 miles south of Matehuala, San Luis Potosí, in which four prefrontals could be counted, but the two lateral ones are cut off from the frontal on each side of the head by the preocular scale. I count three prefrontals (a large one on one side of the middorsal suture and two smaller ones on the other) in three other snakes (K.U. Nos. 67695, 67699, and 67709), but in two of these there are incomplete sutures penetrating for short distances into the large prefrontal. If the incomplete sutures were continued across the scale, a count of four prefrontals would then be possible. In two additional snakes similar short sutures penetrate slightly into what otherwise are two large prefrontals. Two upper labials enter the eye in all 19 snakes. Dixon, Sabbath, and Worthington (1962, p. 95) comment on variation in pattern elements in this series of *deppei*.

Klauber (1947, p. 12) mentioned a specimen of *Pituophis catenifer* (=*melanoleucus*) *sayi* from along the Río Tamesí in eastern Mexico with two labials in contact with the orbit and suggested that intergradation "may eventually be shown to exist" between *sayi* and *jani* (the name applied to one of the races of *deppei;* see Duellman, 1960, for the most recent review of the species).

The several anomalies discussed above suggest that intergradation, convergence, or perhaps introgression may eventually be demonstrated between what virtually all herpetologists currently assume to be two well-defined species. There probably are enough specimens scattered in museums at the present time to shed considerable light upon, if not indeed to solve, the problem, if all were assembled for examination. But

they will need to be studied and evaluated on a range-wide basis rather than by piecemeal interpretations from scattered states or localities. In the meantime I list them as two separate species but call attention to the fact that the ranges of *affinis* and *deppei*, in the classic sense, are known to overlap widely from southern Chihuahua and southern Coahuila to central Zacatecas and San Luis Potosí. Duellman (1960, p. 603) maps the range of *Pituophis deppei*. The best general map for *affinis* and its related western subspecies is in Klauber (1947, p. 6), but, since it was prepared, *affinis* has been taken considerably farther to the south in southern Sinaloa and northern Durango (Zweifel, 1954, p. 147), and to eastern Durango (Williams, Chrapliwy, and Smith, 1961, p. 6) and San Luis Potosí (Taylor, 1952, p. 813; 1953, p. 1606).

Durango specimens of *affinis* examined and not reported above are from: 6.7 miles northwest of Bermejillo (U.I.M.N.H. No. 48526); 13 miles southwest of Cuencamé (U.I.M.N.H. No. 27146); 15 miles southwest of Cuencamé (U.I.M.N.H. No. 27565); 3 miles northeast of El Palmito[1] (live specimen in the Philadelphia Zoological Garden); La Zarca (A.M.N.H. No. 68350); 5 miles west of La Zarca (live specimen in the Philadelphia Zoological Garden); 31 miles north of La Zarca (A.M.N.H. No. 86001); 34.3 miles south of Tlahualilo (U.I.M.N.H. No. 48522).

Among the 10 specimens of *affinis* from Durango that were examined, the ventrals in seven males vary from 213 to 224 and in three females from 222 to 230. The corresponding subcaudal counts are 53 to 61 for males and 49 to 52 for females. Body blotches in the 10 snakes vary from 33 to 46 (mean 40.9). All these counts are low in comparison with Klauber's "probable normal ranges" for *affinis* (1947, p. 64), and several, in one category or another, are below his minimum counts. They suggest a general shortening of the body in the Durango population in comparison with that of *affinis* from more northern localities.

Sonora mosaueri Stickel

SPECIMENS: *Territorio Sur de Baja California:* Vicinity of La Paz (S.D.S.N.H. No. 52917); approximately 19 miles (by road) west of La Paz (A.M.N.H. No. 87611).

The first of these is a male (total length, 173 mm.; tail length, 33 mm.) obtained by Miss Hope Warren as a result of radio advertising in La Paz

[1] This El Palmito is near the Presa Cárdenas at the junction of the Río de Ramos and the Río del Oro.

(Shaw, 1962, p. 644). The second is a female (total length, 295 mm.; tail length, 54 mm.) found dead on the road in an arid hilly area during the early evening of September 18, 1961. These are the eighth and ninth specimens and the second female of this rare species to be reported in the literature. They extend the known range southward about 90 miles from the previous southernmost mainland station at 3 miles south of Punta San Telmo (Bahía San Carlos) and somewhat less far south from the Isla San José, from both of which the species was reported by Cliff (1954, p. 79). The recorded localities, from Comondú to La Paz, suggest that this species probably occurs throughout much of the southern third of the Baja California peninsula. The La Paz specimen apparently was collected too late to be included in the recently published check list of the herpetofauna of the Cape Region (Leviton and Banta, 1964, pp. 152–154).

Scale counts (male first in each case) are: scale rows 15–14–13 and 15–14–13–14; ventrals 157 and 162; subcaudals 49 and 48. The increase from 13 to 14 scale rows in the female occurs through the addition of an extra row along the middorsal line at a point approximately above the tenth ventral anterior to the vent. This snake also has another anomaly in that there are two preoculars on each side of the head, the upper one being much smaller than the lower. The tail length divided by the total length is 19 per cent and 18 per cent for the male and female, respectively. Both snakes are devoid of pattern and in coloration they agree, in general, with the description of the type series (Stickel, 1938, p. 190).

Collecting details, which were not available for the other female specimen (U.S.N.M. No. 67381) when the original description appeared, have been very kindly given to me by Mr. William H. Stickel. It was found on the trail between Loreto and Comondú. Other pertinent data for this snake are: ventrals 164; subcaudals 39; total length, 309 mm.; tail length, 50 mm.; and tail length divided by total length, 16 per cent.

The known variation in the species, based on the above data and published information, is: ventrals: males, 150–156, females, 162–164; subcaudals: males, 45–49, females, 39–48; tail length divided by total length: males, 19 per cent, females, 16 and 18 per cent. Cliff, in his summary for males (*loc. cit.*), inadvertently included a count of 43 subcaudals, which was from a specimen with an incomplete tail (*fide* Stickel, *loc. cit.*).

Tantilla wilcoxi wilcoxi Stejneger

SPECIMEN: *Zacatecas:* Ciudad de Zacatecas (A.M.N.H. No. 85262).

An adult male measuring 292 mm. in total length and 72 mm. in tail length (tail length divided by total length, 25%) was presented to us August 18, 1960, by Señor Francisco Perez Carreño, proprietor of the Zacatecas Courts near the southeastern edge of the city. He had caught the snake on the grounds of the Courts (elevation about 8000 feet) and preserved it at least a year previously. This is the southernmost record for the subspecies *wilcoxi*. Webb and Hensley (1959, pp. 256-257) reported a juvenile specimen from near Chorro, Durango, and McCoy (1964, p. 48) recorded an adult female from El Calabazal, Zacatecas, which is near the Durango border.

The important scale counts are: ventrals 154; subcaudals 64; upper labials 7; lower labials 6; oculars 1-2; temporals 1-1; mental not in contact with anterior chin shields; preocular not in contact with the postnasal; and scale rows 15 throughout the length of the body. The light nuchal collar is about two scales wide and involves the posterior tips of the parietals and the posterior tip of the seventh upper labial. The collar is complete (not interrupted middorsally). The head cap is uniformly dark brown, including the tip of the snout. In most other details of scutellation and pattern this specimen agrees with the description of the Durango specimen published by Webb and Hensley (*loc. cit.*).

Thamnophis phenax (Cope)

Figures 10, 11

SPECIMENS: *Puebla:* Río Octapa, 2.3 miles north-northeast of Teziutlán (K.U. Nos. 63848, 63849).

The Río Octapa at this locality is a swift-flowing mountain stream passing through a cloud-forest area. The two snakes, one collected on February 12, 1961, by William E. Duellman, and the other on August 17, 1961, by J. B. Tulecke, were taken during the daytime at stream side at the edge of a dense bamboo thicket. The elevation is about 6000 feet. I searched the same area on August 19, 1962, but the only snakes I found were three specimens of *Geophis mutitorques* (A.M.N.H. Nos. 88809, 88810, 89344) and a small *Thamnophis cyrtopsis cyclides* (A.M.N.H. No. 88747) under stones on a hillside above the stream. After learning that I had collected a specimen of *Thamnophis sumichrasti* (see below for use of this name) at a nearby locality, Duellman asked me to report on these two specimens of the poorly known *Thamnophis phenax*.

Both snakes are females, and they measure 571 mm. and 240 mm. in total length, 121 mm. and 52 mm. in tail length, and the tail length divided by the total length is 21 per cent and 22 per cent, respectively. The dorsal scale rows are 19-17, with the reduction resulting from the

fusion of the third and fourth rows of scales. The upper labials are eight, with the fourth and fifth entering the eye; the lower labials are 10. The oculars are 1-3 and the temporals are 1-2, except that there are three secondary temporals on the right side of the head in K.U. No. 63849. The anal plate is single in both, and no scale pits were detected. Counts that vary between the two snakes are: ventrals 147 and 151 and subcaudals 57 and 62 (data for K.U. No. 63848, the larger specimen, appears first in each instance).

Duellman supplied the following color notes (in quotation marks), which were recorded soon after the snakes were caught: "K.U. No.

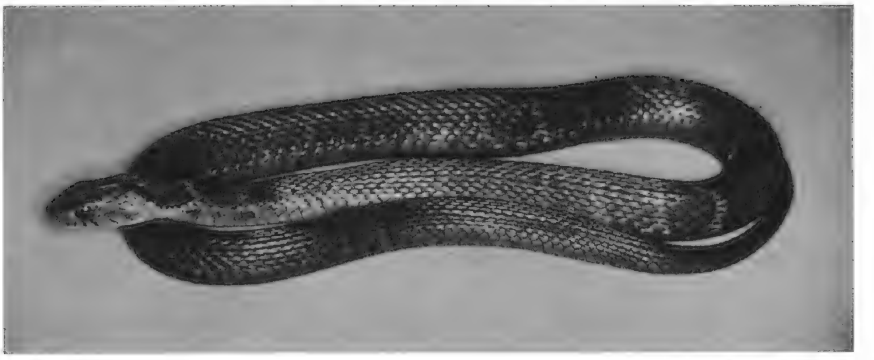

FIG. 10. *Thamnophis phenax* (K.U. No. 63848); 2.3 miles north-northeast of Teziutlán, Puebla; total length, 571 mm.; female.

63848—Dorsal blotches dark reddish-brown, interspaces grayish-tan; top of head olive-tan; chin white; venter dull grayish-tan; iris reddish-tan; tongue black. K.U. No. 63849—similar but with belly dull gray." There are no ventral markings, but there is dark pigment on the bases of the ventrals and subcaudals; a posterior small fraction of the anal plate is light in coloration.

The large, reddish brown, black-bordered saddles (cross bands) are three or four scales wide in the longitudinal axis of the body (five in the nuchal region) and extend downward on the sides of the body to or nearly to the first row of scales. In the larger specimen the saddles, which number 37 on the body and approximately 16 on the tail, are not in sharp contrast with the lighter ground color (fig. 10), and there are no well-defined lateral markings.

In the smaller snake (K.U. No. 63849) the saddles, which number 38 on the body and 17 on the tail, are similar but contrast much more strongly with the ground color. Only a few of them reach the first row

of scales; most terminate on the second row. On each side of the body there is a row of small, reddish brown, black-bordered spots on the first row of scales and the adjacent tips of the ventrals and the lowermost edges of the scales of the second row; the small spots of the lateral row alternate in position with those of the large dorsal saddles. All the saddles cross the back. They are not divided along the middorsal line into two alternating rows as are those in a paratype of Cope's *Eutaenia phenax* (U.S.N.M. No. 30498), which I recently examined. Both Smith (1942, p. 100) and Taylor (1949, p. 205) comment upon alternating pairs of dorsal blotches in *phenax*.

The dorsal surface of the head and the nape of the smaller snake are shown in figure 11A. This specimen also has a bold black line extending obliquely downward across the anterior temporal and the posterior part of the seventh upper labial and also encroaching slightly onto the parietal and the eighth upper labial; it is continued across the mouth in the form of a small black spot on the penultimate lower labial. Black pigment is present on the posterior edges of the first five upper labials, and this is strongest on the fourth and fifth, producing two strong black lines extending downward from the eye.

Most of the head markings on the larger snake, although similar, are comparatively inconspicuous. The greatest contrast is in the reduction of the amount and intensity of the black markings. The black oblique line posterior to the eye, which is so conspicuous in the smaller snake, is absent in the larger one.

Thamnophis sumichrasti (Cope)

Figures 11, 12

SPECIMEN: *Puebla:* Six miles north-northeast of Teziutlán (A.M.N.H. No. 88808).

Rossman (in press) may be consulted for use of the name *sumichrasti* in preference to *Thamnophis halophilus* Taylor.

This snake was collected at an elevation of 5200 feet during the early afternoon of August 19, 1962, when it emerged from dense brush in a cloud-forest area and entered a small, water-filled depression a short distance off the Teziutlán-Nautla road (Mexico Highway No. 125). It is a male with a total length of 614 mm. and a tail length of 140 mm.; the tail length divided by the total length is 23 per cent. The scale counts are: dorsal scale rows 19–17, the reduction resulting from fusion of the third and fourth rows; ventrals 160; anal single; subcaudals 72; upper labials 8, the fourth and fifth entering the eye; lower labials 10; one pre-

ocular; 3 postoculars on the left side of the head and 4 on the right; and temporals 1-2.

No apical pits were found. The specimen was kept alive for several weeks in the hope that it would shed and provide a skin that could be mounted against a white background for study (Conant, 1961, p. 18), but it failed to feed and was preserved when it became noticeably thin.

The general over-all appearance of this snake, when viewed from above in life, was strongly *Storeria*-like, an observation that parallels one made by Taylor (1940, p. 183) in his paper describing *Thamnophis halophilus*.

Since *sumichrasti* is still a rarity in collections, I describe the coloration and pattern in some detail. The dorsal ground color, in life, as recorded in a series of color slides (checked against the animal before it was killed), was a rich medium brown, with orange tones on the sides of the neck,

FIG. 11. Head patterns in *Thamnophis phenax* and *Thamnophis sumichrasti*, dorsal views. A. *Thamnophis phenax* (K.U. No. 63849) from 2.3 miles north-northeast of Teziutlán, Puebla; total length, 240 mm.; female. B. *Thamnophis sumichrasti* (A.M.N.H. No. 88808) from 6 miles north-northeast of Teziutlán, Puebla; total length, 614 mm.; male.

changing to a grayer brown on the posterior part of the body and on the tail. In general, the ground color, including that of the head, was virtually uniform and without abrupt changes in tone. The upper labials were light orange-brown. The under side of the head, including almost all of the lower labials, was cream-colored, almost white. Light pigment became progressively darker for about the first dozen ventral scutes, gradually changing to the dark coloration of the venter, which was light greenish gray, with a strong overwash of warm brown quite similar to that of the dorsal surfaces; the under side of the tail was similarly pigmented.

Except for some irregular dark stippling, which is strongest along the bases of many of the ventrals, the belly is unmarked. The venter of the tail is similar, but the bases of most of the subcaudals are dark, at least on the distal three-fourths of the tail. All the dorsal markings, including the nuchal blotches (fig. 12), are black. There are numerous small black spots, and these are arranged roughly in five rows, the lowermost on the first row of scales and the next on the third and fourth rows; in the mid-

dorsal area the spots involve the seventh to ninth rows on each side of the body as well as the middorsal row. The dorsal surface of the head and nape are shown in figure 11B. Each of the two nuchal blotches involves three scales in the direction of the longitudinal axis of the snake and seven scales transversely; the blotches are separated from each other by the width of one scale. There is a large black spot on each parietal situated near the midline, and each, although strongly invaded by the brown of the ground color, is nearly equal in size to the adjacent nuchal

FIG. 12. *Thamnophis sumichrasti* (A.M.N.H. No. 88808); 6 miles north-northeast of Teziutlán, Puebla; total length, 614 mm.; male.

blotch. There is a blunt black V on the posterior part of the frontal and a black spot on the posterior edge of each prefrontal. A black line, interrupted in part, extends obliquely downward and backward from the eye. It occurs chiefly on the anterior temporal and along the posterior border of the seventh upper labial, but it also encroaches slightly onto the parietal and crosses the mouth line in the form of a small dark spot on the penultimate labial on the left side of the head and on the last labial on the right. Black pigment is present on the posterior edges of the first five upper labials. The dark markings on the side of the head are strikingly similar to those of the smaller specimen of *Thamnophis phenax* (K.U. No. 63849) described under that species. The dorsal head markings are also similar (fig. 11), but those of the specimen of *sumichrasti* are less elaborate and include less black than those of the specimen of *phenax*.

Smith (1942, p. 100) suggested that *halophilus* (=*sumichrasti*) should be

considered as a race of *Thamnophis phenax*, but more recently Taylor (1953, p. 1610), on the basis of apparent sympatry between *phenax* and *halophilus* on the Cerro Conejo, near Xilitla in southeastern San Luis Potosí, used a binomial for each. The present specimen of *sumichrasti* from Puebla also suggests sympatry, since it was caught only a short distance from the locality along the Río Octapa where two specimens of *Thamnophis phenax* were collected (see above). Although the data indicate that the two species were found almost 4 miles apart, they were actually much closer together, for the distances from Teziutlán were measured along the tortuous road that winds its way through this rugged part of the Sierra Madre Oriental. The marked differences in the two habitats suggest an ecological separation, but too little is known about either species to permit speculation.

Tretanorhinus nigroluteus lateralis Bocourt

Figure 13

SPECIMEN: *Oaxaca:* Fourteen miles north of Matías Romero (A.M.N.H. No. 88833).

During our search for *Natrix* on the Atlantic slope of the Isthmus of Tehuantepec we stopped at each stream and culvert along the transisthmian highway (Mexico No. 185), and this snake, a juvenile female, was found during the evening of August 4, 1962, as it crawled along the bank at the edge of a clear, flowing rill not more than a foot wide.

The scale counts are: dorsal rows 21–19–17; ventrals 131; subcaudals 69; upper labials 7, the third entering the eye; lower labials 10, the sixth the largest; oculars 2–2; and temporals 1–2. There are a single large loreal and two prefrontals.

Certain peculiarities of the labials, both upper and lower, require comment. The second upper labial is large and probably represents a fusion of two smaller labials, the second and third. Among 11 other specimens of *Tretanorhinus* from Honduras, Mexico, and Nicaragua, which I compared with the Oaxaca snake, the labial count is eight (nine on one side of the head in one specimen), and the fourth invariably enters the eye. Among the lower labials there is an extra scale wedged in, almost at the commissure, between the ninth and tenth labials, with its long axis seemingly paralleling the line of the mouth. This same characteristic appears in all 11 other snakes. When their mouths are closed, the situation is as described above, but, when the mouth is forced open or the upper labials are lifted out of the way, it is apparent that the last lower labial, which extends backward from the mouth at an oblique

angle (almost horizontally in some), is split in two and that the extra scale represents its approximately upper or forward half, or both. On one side of the head of each of two snakes the extra scale is split again, so that the last labial, in these instances, is in three parts.

When the photograph (fig. 13) was made, the snake measured approximately 245 mm. in total length. It was kept alive to be photographed in color, but it died before our next stop and became slightly desiccated. The head-body length of the preserved specimen is 168 mm.; the tail is twisted and cannot be measured accurately.

A dark lateral stripe originates at the rostral, crosses the lower half of the eye, involves the lower oculars, all the labials, and the lower parts of the temporals and upper oculars, and continues along the side of the

FIG. 13. *Tretanorhinus nigroluteus lateralis* (A.M.N.H. No. 88833); 14 miles north of Matías Romero, Oaxaca; total length, 245 mm.; female.

body on the first and second scale rows and (irregularly) on the lateral tips of the ventrals. On approximately the anterior third of the body the stripe is solid dark, but posteriorly it weakens, light areas appear on the otherwise dark scales, and eventually it is represented only by dusky areas, these concentrated chiefly on the edges of the scales. The stripe fades out completely on the base of the tail. There is another dark stripe on the nape, beginning at the posterior tips of the parietals and involving the middorsal and adjacent rows of scales. This soon changes to a series of small, dark, oval blotches (fig. 13) that are first joined, then discrete, and finally are divided into a double row of ovoid dark spots arranged on opposite sides of the middorsal line, in some cases alternating with and in others fusing (usually partially) with their partners of the other side. The small ovoid spots involve about two scales in the longitudinal axis of the body and all or parts of three to five scales transversely. The

spots are continued on the tail. The crown of the head (parietals and frontal) is dark brown, with scattered darker stippling. The under side of the head and the throat are dark except for light speckling. The belly is chiefly light, but there are irregular squarish spots and dark streaks and bars, mostly along the midventral line. In life the dorsum was medium grayish brown, and the stripes and spots were dark brown. The chin and throat were dark brown. The belly was tan, but it changed to light orange-red posteriorly and was even brighter orange under the tail.

Although two adult snakes from near Teapa, Tabasco (see below), are very much darker and have considerably more black pigment on the venter, the pattern on them is basically similar to that of the snake from Oaxaca.

The coloration and pattern of the specimen described in detail above are in striking contrast with those of a juvenile from British Honduras reported by Neill and Allen (1959, p. 49) in which the dorsum was virtually uniform blackish in life and the venter and a lateral stripe were scarlet. Duellman (1963, p. 244) described still another pattern from a comparatively small male from the southern El Petén region of Guatemala, and there is considerable variation in a series of 10 specimens of assorted sizes from Honduras and Nicaragua in the American Museum of Natural History collection (see below). Two races are now recognized. Dunn (1939, pp. 215–216) separated the subspecies *lateralis* and *nigroluteus* "by color," depending upon whether the lower scale rows were light or dark and whether the belly was heavily pigmented or not. Dunn worked at a disadvantage, however, for only preserved material was available to him, and much of it was probably faded, stained, or otherwise altered. The acquisition of detailed color and pattern data from many live or freshly preserved specimens and from many localities will be a prerequisite for any thorough future reassessment of the *nigroluteus* complex.

This record is apparently the first for Oaxaca. Smith and Taylor (1945, p. 145) reported *lateralis* from Pacaitun (=Pacaytún), Campeche, and Smith (1960, p. 223) recorded it from 15 miles north of Teapa, Tabasco.

The following specimens were compared with the Oaxaca snake: *Honduras:* Agua Azul, Cortés (A.M.N.H. Nos. 70221, 70222); Lake Yojoa, Cortés (A.M.N.H. No. 70181); Lake Yojoa, Islita, Cortés (A.M.N.H. Nos. 70223–70226). *Mexico:* Fifteen miles north of Teapa, Tabasco (U.I.M.N.H. Nos. 47902, 47903). *Nicaragua:* Bluefields, Zelaya (A.M.N.H. Nos. 12442, 12443); 2 miles from Pia Creek, Zelaya (A.M.N.H. No. 12444). One of the snakes from Agua Azul (A.M.N.H.

No. 70221) was found in the stomach of a bittern, and, since it had been partially digested, no scale counts could be made on the head.

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